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ABSTRACT

These four documents are concerned with methods of introducing ecology to elementary and kindergarten children. The first describes techniques for use in a classroom investigation of growing plants, emphasizing the interrelationships of plants and environment and is designed so that children learn variables must be controlled to arrive at valid conclusions. The second describes the organization of a "nature hunt" for kindergarten pupils. It is arranged so that the child experiences many areas of the primary school curriculum, including science, language arts, reading, numeral awareness, social studies, set theory, and music. The third outlines methods of using natural objects in art, including printing, casting, photography, soil and sand painting and weaving rush mats. An attempt is made to present art activities that will also be science experiences. The last is a classroom activity to emphasize the extent that non-returnable and non-decomposable containers are accumulating in the environment; each student records the number of containers used in a week and then an estimate is made of the amount the local community accumulates in a year. Suggestions for appropriate student actions are made. This work was prepared under an ESEA Title III contract. (AL)

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PLANTS IN THE CLASSROOM

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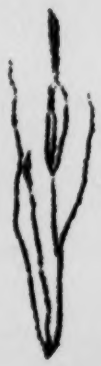

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Introduction

Plants are grown in the classroom quite often. Many of the plants in this lesson are common classroom subjects. However, we have gone one step further in this investigation than is normally undertaken in growing classroom plants. At the Environmental Science Center we are concerned with introducing ecology to children. Ecology is the interrelationship of living things with other living things and with non-living things. We are also concerned with the way in which a child approaches his study of ecology. As our concerns are twofold, so is the purpose of this lesson. (1) The class investigates the interrelationship of their plants with the environment (amount of sunlight, amount of water, room for growth, and type of soil); and (2) They learn they must control the variables in the plant's environment before they can arrive at valid conclusions. This procedure is vital in any science investigation, however, it is often ignored by children.

PLANTS IN THE CLASSROOM

Introduction

Materials

Activities

I. Cutting

II. Carrot Tops

III. Sweet Potatoes

IV. Potatoes

Group 1 — Moisture and Sprouting

Group 2 — Growth and Soils

Group 3 — Water Needs for Growth

Group 4 — Sunlight Needs for Growth

Group 5 — Container Size and Growth

V. Bulbs

VI. Seeds

A. Germination

B. Wild Bird Seed (Evaluation)

VII. Extended Activities

PLANTS IN THE CLASSROOM

Children often see plants growing in the classroom and plant seeds either in the classroom or outdoors. We, as teachers, often "tell" them three things about growing plants.

1. Plants need soil.
2. Plants need water.
3. Plants need sunlight.

We direct the children to "put it by the window", "water it every day", etc. We do not often even tell them that the good soil contains food in the form of minerals for the plant, that the water carries the food to the leaves, and that the sunshine converts the food to growth energy.

These activities and experiments with plants and seeds include six distinct types of plants.

1. A cutting from a house plant.
2. Carrot tops grown in water and then soil.
3. Sweet potatoes grown in water.
4. Red and white potatoes grown in soil.
5. Bulbs grown in pebbles.
6. Seeds, germination, and growth in soil, etc.

If you wish to simply "grow" these six types of plants in the classroom the children can gain much knowledge of care, growth patterns, and differences in plants.

If you wish to have the children also develop the understanding of experimentation, variables in an experiment, keeping records, using data to reach understandings, then follow the unit activities.

The suggested records to keep with each activity are indicated in the text and full page copies of the record sheets are in the back so that you can remove them and copy them for the children.

Materials:

pots
jars
low bowls
coffee cans, 2 and 3 lb.
soil - black, sandy, clay, commercial
water
blotter paper
construction paper
large spoon
milk cartons
large house plant, philodendron, etc.
carrot top
sweet potatoes
red and white potatoes
bulbs
pebbles

I. Plant Cutting

-- Keep a philodendron plant in your room until you are ready to begin this activity

-- Divide the class into small groups — perhaps classroom rows or other grouping.

-- Provide each group with a transparent container.

-- Have a group member fill it with water.

-- Have members from each group:

  -- take a cutting from plant (be sure each group gets an end cutting).

  -- place cutting in transparent container.

  -- identify container with a numeral or name and a clear note of its location in the room.

-- Have each group select a location in the room for container and place it there.

-- Have each group keep container well filled with water.

-- Watch for rooting.

ASK THE CHILDREN:

ABOUT THE DIFFERENT WAYS THE PLANTS ARE BEING HANDLED. (LOCATION IN ROOM)

ABOUT THE WAYS THE PLANTS ARE BEING HANDLED THE SAME. (CONTAINERS, AMOUNT OF WATER, TIME FOR WATERING)

ABOUT THE DIFFERENCES IN THE PLANTS THEMSELVES. (SOME CUTTINGS ARE LARGER)

-- Have each group (this idea will hopefully come from a member of the class) measure the total <u>length of the cutting</u> (use a piece of string and place it on a ruler), and note the number, length, and width of the leaves. (An interesting way to record this would be in picture form — have the children carefully trace the cutting on paper and record its measurements along the side — length of cutting; width of leaf or leaves; length of leaf or leaves.)

PLANT CUTTING

Record When in Water

	Beginning	End Wk. 1	End Wk. 2	End Wk. 3	End Wk. 4
1. Length of cutting					
2. Number of leaves					
3. Width of leaves					
4. Length of leaves					
5. Number of roots developed					
6. Length of roots developed					

-- When the roots are two or three inches long, replant by group in soil. Be sure the containers are identical. A peanut butter jar would be an appropriate size.

-- Use the same kind of soil for all the plantings so that you can have a controlled experiment. You may want to use black top soil from someone's yard or a "black magic" type of commercial soil.

-- Plan how much water every plant will receive and how often they will be watered. (Plan to water every day — enough to keep the soil moist.)

Now you have similarly rooted cuttings, the same kind and size containers, the same soil, plans to water the same amount each day. You are ready to conduct an experiment testing the need of sunlight.

ASK THE CHILDREN:

ABOUT THE WAYS THAT THESE PLANTS ARE BEING HANDLED THE SAME. (SAME CONTAINER, SAME SOIL: SAME WATER PLANS)

ABOUT WHAT IS NOT EXACTLY THE SAME, BUT SIMILAR. (THE PLANT ITSELF)

ABOUT OTHER NEEDS A PLANT HAS THAT WE CAN VARY AND THUS TEST. (NEED FOR SUNLIGHT)

-- Have each group select a location for their plant which will give a variety of sunlight. (If a group wants to, they can place their plant in a dark place.) Don't force this, however. If you want the test made, establish another cutting in the beginning.

-- Have the children record information each week on their record sheets.

PLANT CUTTING

Record When in Soil

	Initial	End Wk. 1	End Wk. 2	End Wk. 3	End Wk. 4
1. Length of cutting above soil					
2. Number of leaves					
3. Width of leaves					
4. Length of leaves					
Length of entire plant from top of leaf to end of longest root (optional since the plant will have to be removed from the soil and replanted					

-- Have the children plan a comparative chart and fill it in from their group records.

ASK THE CHILDREN

ABOUT THE LIGHT NEEDS OF THIS TYPE OF PLANT.

ABOUT ANY FACTORS THAT MAY HAVE INFLUENCED THE RESULTS. (HEAT, FORGETTING TO WATER, ETC.)

IF THEY COULD BETTER CONTROL AN EXPERIMENT.

-- Have the children place their plant in a location and continue to watch them grow. Continue recording if there is interest.

II. Carrot Tops

-- Have children bring in carrot tops.

-- Place in a shallow container.

-- Put in enough water to come close to the top of the carrot pieces.

-- Permit to grow.

-- Measure and record growth.

Carrot Top Growth				
	Initial	End Wk. 1	End Wk. 2	End Wk. 3
Height of Top				
Width of Top				
Number of Roots				
Number of Shoots				
Height of Shoots				

-- When the carrot tops are about three inches tall, transfer them to soil. Keep all other variables constant — same containers, same amount and pattern of watering, same location — vary only the soil types. Try to use at lease four different soils -- sand; clay (try your school art clay); black soil (from a yard); and commercial soil.

-- Have each planting labeled as to group, soil type, etc.

III. Sweet Potatoes

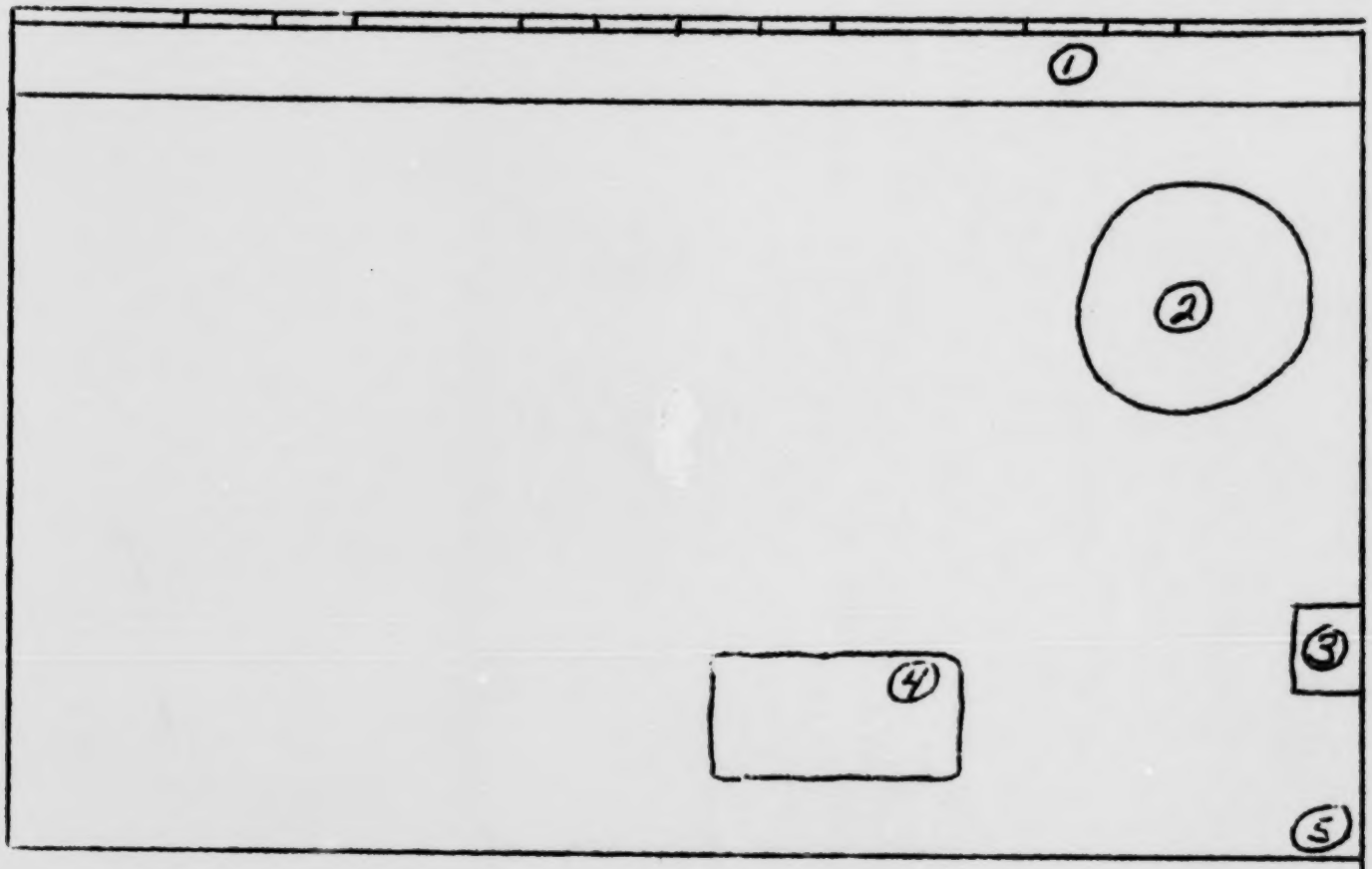
-- Have children bring in a sweet potato. Be sure you have at least one potato for each group.

-- Have groups place whole sweet potato into a tall transparent container. Be sure that only half of the potato is submerged in the water. The potato can be held up with toothpicks inserted into three sides of the potato and resting on the edge of the container.

If the children wish to plant them in soil or any other substance, encourage them to do so.

-- Have the children place the sweet potatoes in different locations — try to vary this a great deal (i.e. one in direct sun, one in a dark closet, etc.). If there is difficulty in initiating growth it could come from a growth deterrent spray or from the fact that there is a definite "up" and "down" of a sweet potato and it is often difficult to determine which is which.

For records, have the children sketch a map of the room numbering the locations. Then keep records by date and sprout length.



Sweet Potato Growth Record Sheet

Date Planted —

Date First Root Appeared —

Date First Sprout Appeared —

Date Longest Sprout Reached Two Inches —

(Allow children to add other significant dates.)

ASK THE CHILDREN:

ABOUT THE BEST CONDITIONS FOR SPROUTING A SWEET POTATO.

ABOUT THE BEST CONDITIONS FOR GROWING A SWEET POTATO.

ABOUT OTHER CONDITIONS THAT INFLUENCE THE GROWTH.

IV. Potatoes

Divide the class into five groups. Each group will conduct their own experiment with potatoes. Each group will need at least one red and one white potato.

Group 1 — Moisture and Sprouting

-- Cut the potatoes into several pieces, each including a few eyes.

-- Have each group place a portion of their potato in the following places:

1. In a baggie on a dry piece of paper towel in a sunny place.
2. In a baggie on a dry piece of paper towel in a dark place.
3. In a baggie with a moist piece of paper towel in a sunny place.
4. In a baggie with a moist piece of paper towel in a dark place.

Group 1 will have eight pieces of potato to study, four white and four red. If the children wish to add their own experimental conditions, be sure to encourage them to do so.

-- Mark each potato piece with the location, date, and group.

-- Add water to moist pieces when necessary.

	Potato Sprouting Record Sheet		
	Date of Sprout	Amount of Sprout	Height of Tallest Sprout in 3 Weeks
Dry Potatoes			
sunlight			
darkness			
Moist Potatoes			
sunlight			
darkness			

Combine records at the end of the experimental period and present to the rest of the class.

ASK THE CHILDREN:

ABOUT THE EFFECT UPON ENVIRONMENT ON THE POTATO SPROUTING.

Group 2 — Potato Growth and Soils

-- Have the children bring in a white and red potato.

-- Have the children bring in two pound coffee cans in which to plant the potatoes. In this study it will be interesting to check the moisture needed.

-- Have the children cut their potatoes into several pieces — as many as they have coffee cans for. You may, of course, plant a whole potato in a can. Here is a chance, however, to make many tests since potatoes and coffee cans should be plentiful.

Set up pieces from both potatoes in at least four soil types (sand, clay, black dirt, and commercial soil), eight plantings in all. Keep the sunlight and water the same. Check for first sprouting, height of plant, and general growth pattern.

Growth record sheets appear on the next page. When they are completed, display the records near the growing potatoes so the whole class can watch this experiment and discuss it later. When the records have been completed, discuss the following with the children.

ASK THE CHILDREN:

ABOUT WHAT SOIL POTATOES SPROUT IN FIRST.

ABOUT THE KIND OF SOIL THEY GROW THE LARGEST IN.

DISCUSS HEIGHT VS. THICKNESS IN RESPECT TO LARGENESS.

Group 2 — Potato Growth Records

Red and White Potatoes

Amount of Water _____

Frequency of Water _____

Location in Room _____

	Date of Planting	Date of First Sprout
Red Potatoes in sand		
in clay		
in black soil		
in commercial soil		
White Potatoes in sand		
in clay		
in black soil		
in commercial soil		

	Second Week			Third Week			Fourth Week		
	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves
Red Potatoes in sand									
in clay									
in black soil									
in commercial soil									
White Potatoes in sand									
in clay									
in black soil									
in commercial soil									

Group 3 — Water Needs for Potato Growth

Set up pieces of both red and white potatoes in the same soil, and keep constant in the same room location for sunlight. Vary only the amount of water. Plant in two coffee cans. Select the type of soil the group wishes to use. Decide how many different amounts of water you will check. Since you are using two pound coffee cans, you could use 1/4 cup per day, one half cup per day, one cup per day, and two cups per day.

Record as follows:

		Water Test for Potato Growth								
		Second Week			Third Week			Fourth Week		
	Sprout Date	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves
Red Potato 1/4 C.										
1/2 C.										
1 C.										
2 C.										
White Potato 1/4 C.										
1/2 C.										
1 C.										
2 C.										

Display this record sheet near the growing potatoes and the whole class can watch the experiment and discuss it later.

ASK THE CHILDREN:

ABOUT THE AMOUNT OF WATER NEEDED.

WHY THE POTATOES WERE ALL PLANTED IN THE SAME SIZE CONTAINERS.

ABOUT THE "CONSTANTS" OF THIS EXPERIMENT.

Group 4 — Sunlight Needs for Potato Growth

Bring in both a red and white potato. Bring in at least six coffee cans. Divide the coffee cans equally between the red and white potatoes (three for each). Select the type of soil you want to use for all plantings (probably black soil). Cut each potato into three pieces and plant in the coffee cans. You are going to test sunlight needs for growing potatoes so you will keep the other variables the same; container size, soil, amount of water, and frequency of watering. To check the sunlight need, have one of each potato in the sunniest spot in the room, another in the center of the room, and the third (of both red and white) at the far side of the room, away from windows.

Record as follows and display for class participation:

Sunlight Needs for Potato Growth										
		End First Week			End Second Week			End Third Week		
	Sprout Date	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves	Ht.	No. Sprouts	No. Leaves
Red Sunny										
Middle										
Shady										
White Sunny										
Middle										
Shady										

ASK THE CHILDREN:

ABOUT SUNLIGHT NEEDS.

IF THIS TEST IS COMPLETE ENOUGH.

ABOUT OTHER LIGHT CONDITIONS
THAT COULD BE ADDED.

Group 5 — Container Size and Growth of Potatoes

Materials:

red potatoes

white potatoes

8-10 different size containers

2 babyfood jars

2 peanut butter jars

2 2-lb. coffee cans

2 3-lb. coffee cans

2 large containers, when possible

Since you are testing for the influence of container size of final potato growth, keep other variables the same — soil, sunlight, frequency of watering. However, adjust amount of water to the size of the container — keep the soil equally moist in all containers. Cut each potato into several pieces.

Record growth and display for class use.

Container Size and Maximum Growth of Potatoes

	Ht. at end of 2nd week	Ht. at end of 3rd week	Ht. at end of 1st month	Ht. at end of 2nd month
Red baby jar				
p.b. jar				
2 lb. can				
3 lb. can				
larger				
White baby jar				
p.b. jar				
2 lb. can				
3 lb. can				
larger				

Graph the growth patterns as follows:

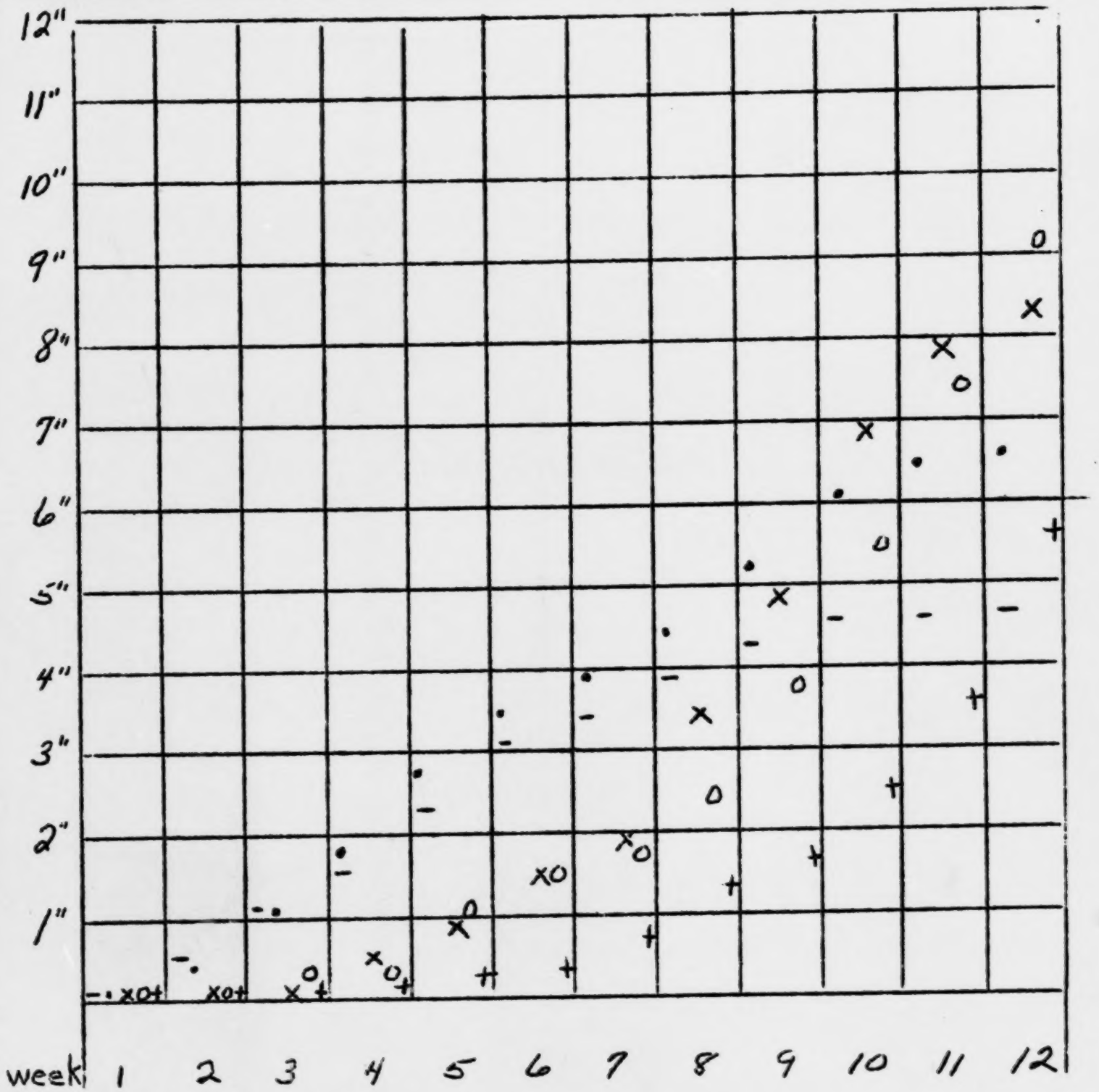
babyfood jar ------

peanut butter jar .....

2 lb. coffee can xxxxxx

3 lb. coffee can oooooo

larger ++++++



If there is interest, have the children continue their study by bringing in other vegetables and setting up their own experiments.

V. Bulbs can be planted by the entire class

Follow planting directions from purchases. Use to decorate the room and to inform children of another form of plant growth. Children now may wish to make growth tests and record the results. Encourage any children who wish to, to do so.

Materials:

several bulbs

transparent container — low

pebbles

VI. Seeds

Materials:

bean seeds (1 or 2 packages)

pea seeds (1 or 2 packages)

corn seeds (1 or 2 packages)

wild bird seed (1 box)

sponges

blotter paper

low containers (tin foil trays)

baggies

milk cartons

(Lay the quart and 1/2 gallon size on its side and cut off the top side -- tape the opening closed and you have a fine planter.) (If you want to make the planters very attractive, you can paint the outside with tempra paint mixed with liquid soap instead of water.)

nut cups

paper plates

A. Seed germination

-- Divide the class into three groups. Each group will use one kind of seed.

-- Have each person in the class set up seed germination conditions that are different from the others in his group. Have the children consider the following conditions:

moisture

sunlight

covering for container

temperature (keep refrigerated)

-- Have each group devise a recording format that will be easy to use and easy to understand.

B. Wild bird seed

-- Give each child 1/2 nut cup of bird seed.

-- Give each child a paper plate.

-- Have the children spill the seed out onto the paper plate.

-- Examine seeds (sort, count, etc.).

****

The rest of the activities in this unit will be invented by the children. It is a good idea to have each child work individually. Then their activities can be your evaluation of the child's understandings.

1. Does the child develop a "valid" test?
2. Does the child test only one condition at a time?
3. Does he control other variables?
4. Is the child able to cope with all the variables or does he need assistance?
5. Does he develop a clear set of records?

There are broad ranges of activities possible with these seeds. Some are:

1. Find out what kind of a plant each kind of seed will grow.
2. Find out the best soil for one of the seed types.
3. Find out the sunlight needs of one of the seed types.
4. Find out the water requirements of one of the seed types.
5. Find out the growth pattern of one of the seed types.
6. Find out how tall the plant of one seed type can grow in six weeks.
7. Find out which seed would grow best when planted together.

****

Extended Activities

1. Collect mosses and liverwarts from logs, soil, or trees, and determine the care necessary to keep it alive and growing.

2. Grow mold on bread in various conditions considering sunlight, dark, water, air, container, etc. Determine the environmental needs for mold growth.

3. Set up a mold garden or two with bread, cereals, fruit and vegetables, in a clear plastic hat or sweater box. If you set up only one, be sure to keep it well moistened.

4. Examine science textbooks in your school for interesting experiment, i.e. extracting green from leaves using alcohol and testing for starch in leaves.

PLANT CUTTING

Record When in Water

	Beginning	End Week 1	End Week 2	End Week 3	End Week 4
1. Length of cutting					
2. Number of leaves					
3. Width of leaves					
4. Length of leaves					
5. Number of roots developed					
6. Length of roots developed					

PLANT CUTTING

Record When in Soil

	Initial	End Week 1	End Week 2	End Week 3	End Week 4
1. Length of cutting above soil					
2. Number of leaves					
3. Width of leaves					
4. Length of leaves					
Length of entire plant from top of leaf to end of longest root (optional since the plant will have to be removed from the soil and replanted					

CARROT TOP GROWTH

	Initial	End Week 1	End Week 2	End Week 3
Height of Top				
Width of Top				
Number of Roots				
Number of Shoots				
Height of Shoots				

POTATO SPROUTING RECORD SHEET

	DATE OF SPROUT	AMOUNT OF SPROUT	HEIGHT OF TALLEST SPROUT IN THREE WKS.
Dry Potatoes Sunlight			
Darkness			
Moist Potatoes Sunlight			
Darkness			

POTATO GROWTH RECORDS

Red and White Potatoes

Amount of Water _____ Location in Room _____

Frequency of Water _____

	Date of Planting	Date of First Sprout
Red Potatoes in sand		
in clay		
in black soil		
in commercial soil		
White Potatoes in sand		
in clay		
in black soil		
in commercial soil		

WATER TEST FOR POTATO GROWTH

		Second Week			Third Week			Fourth Week		
	Sprout Date	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves
Red Potato 1/4 C.										
1/2 C.										
1 C.										
2 C.										
White Potato 1/4 C.										
1/2 C.										
1 C.										
2 C.										

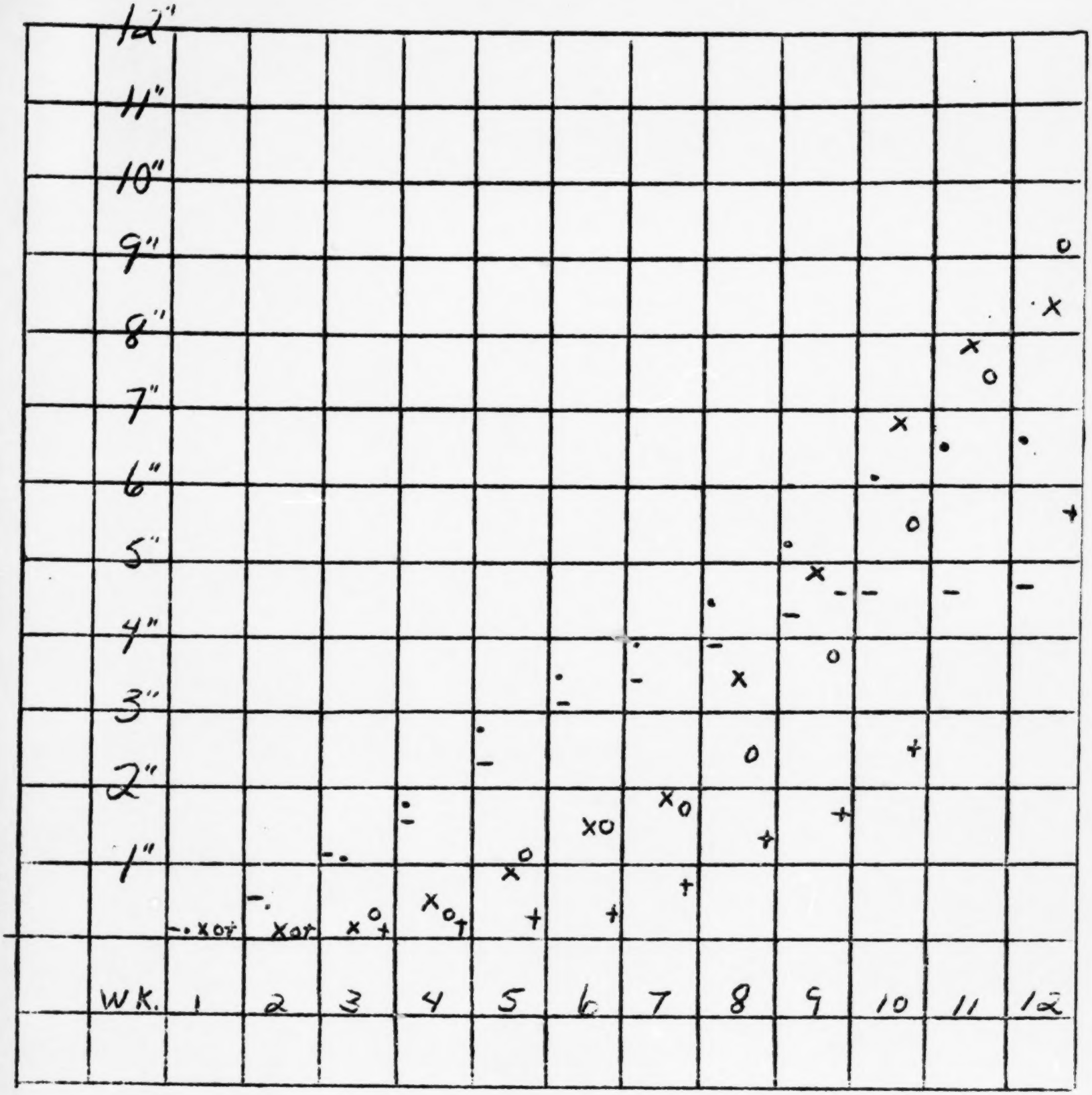
SUNLIGHT NEEDS FOR POTATO GROWTH

		End First Week			End Second Week			End Third Week		
	Sprout Date	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves
Red										
Sunny										
Middle										
Shady										
White										
Sunny										
Middle										
Shady										

POTATO GROWTH RECORDS

	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves	Height	No. Sprouts	No. Leaves
Red									
in sand									
in clay									
black soil									
commercial soil									
White									
in sand									
in clay									
black soil									
commercial soil									

Container Size and Maximum Growth of Potatoes				
	Height at end of Second Week	Height at end of Third Week	Height at end of First Month	Height at end of Second Month
Red babyfood jar				
peanut butter jar				
2 lb. can				
3 lb. can				
larger				
White babyfood jar				
peanut butter jar				
2 lb. can				
3 lb. can				
larger				



baby jar ------

peanut butter jar .....

2 lb. coffee can xxxxxx

3 lb. coffee can oooooo

larger ++++++

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NATURE HUNT

Overview

Nature Hunt is a series of activities for in classroom and out-of-doors that has been written for and used by kindergarten classes and special education classes. The pre-trip classroom activities take seven or eight days. The major outdoor activities take one-half to one full day and can be planned as a field trip to a local natural area or park. The post-trip activities can extend beyond a week if the interest continues.

Nature Hunt is set up as a game. On a trip to a local natural area or park, small groups of children are given Nature Hunt containers which hold many natural items found in the park, soil samples, rocks, and photographs of areas in the park.

The point of the game is to locate items as similar to those in the container as possible and to locate where the photographs were taken. The children collect these matching items and other items of interest. In addition they collect a bag full of evidence that humans use in park. This leads to many new ideas, sharing reactions, and communicating through language, art and music.

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NATURE HUNT

Contents

1. Overview
2. Contents
3. Introduction
4. Materials
5. Preparation
6. Pre-trip Activities
7. Trip Activities
8. Post-trip Activities

Introduction

Nature Hunt involves children in outdoor activities which give the child experience with seven discipline areas common to the primary school curriculum. Each child will be experiencing nature, variation in natural items, and a beginning awareness of conservation, which comes under the larger heading of science. The plan to use numerals in designating groups will involve the child with numeral awareness and recognition.

Arranging and re-arranging items involves set theory. The word cards bring reading readiness into the study. Language arts are practiced when the class discusses any portion of the trip, when individuals tape-record original stories and poems, when the class develops an experience chart, or when the class writes a short poem describing any part of their experience. The social studies are involved when the children locate evidence of humans in the park and discuss littering and human use of the park. Music is brought in when the children make up a simple tune to their original poem. Art is always a part of young children's experience as it is their most ready form of recorded communication. You will probably want to use art to record individual responses to each step of the study and to evaluate the understandings the children have gained.

These activities are not written as an individualized program. Rather, the success of it depends on small groups, interaction within the group, exchange of observations and debates centered around arranging and re-arranging the items and aiding each other in extrapolating from the evidence gathered to the possible cause.

The individual learnings gained from these group experiences can be listed under eight headings:

1. Observing - opening eyes - seeing details
2. Comparing - noting similarities - noting differences
3. Arranging natural items in "some" order
4. Re-arranging the same items in a different order
5. Becoming aware of our surroundings as part of our lives
6. Noticing human use of nature and the particular area
7. Communicating through discussion, conversation, art work, experience charts, stories and poems
8. Thinking creatively about extended use of the area by special groups, as grandparents, crippled children, etc.

The material was written for and used by kindergarten classes. With modifications, it can be used with older children. It also can be used in its present form with special education classes.

Materials

Camera
Film for 18-30 pictures
Plastic bags - small - 150 or more
Three pound coffee cans or shoe boxes - 5 or 6
Plastic spray (optional)
Labels - heavy duty
Tagboard for word cards
3 x 5 cards
Large brown paper bags
Pencils - 5 or 6
Crayons
Paint
Rubber bands
Scissors, 1 pair
Drawing paper
Construction paper

Preparation

Prior to the trip, make the following preparations. Allow yourself a week to complete the preparations.

A. For the Field Trip

1. Select a natural area or park nearby.

2. Photograph (1 hour)

   a. Landmarks - 5 or 6 if possible
   b. Ten or more views of any water area, river, creek, swamp, or lake
   c. Ten or more trees that can easily be distinguished
   d. Special features, soil erosion areas, fallen trees, fire area, etc. Try to include at least six; one for each group.

3. Have these photographs developed, printed, and the clear pictures enlarged to 5 x 7 or a size convenient for children's use. (This step may take a week.)

4. Collect items at the park or the natural area you have selected (1 hour). Collect only items that will not damage living things. Collect one of each item for every group you have. You will want four or five children in one group so you will probably have five or six groups.

a. Dead leaves (6)

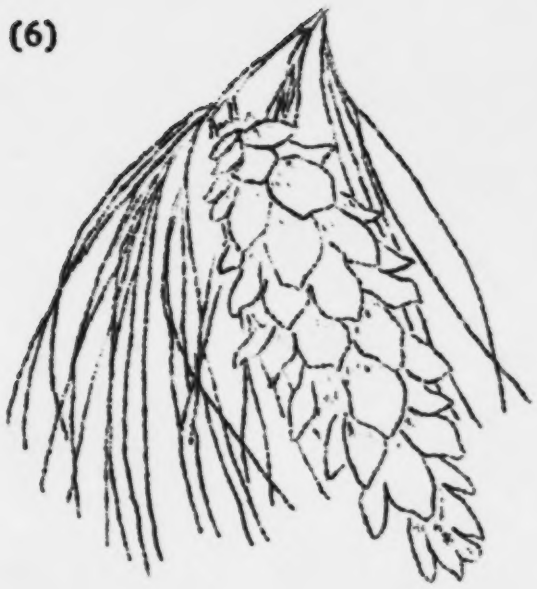
b. Weeds (6)

c. Seeds and seed pods (6)

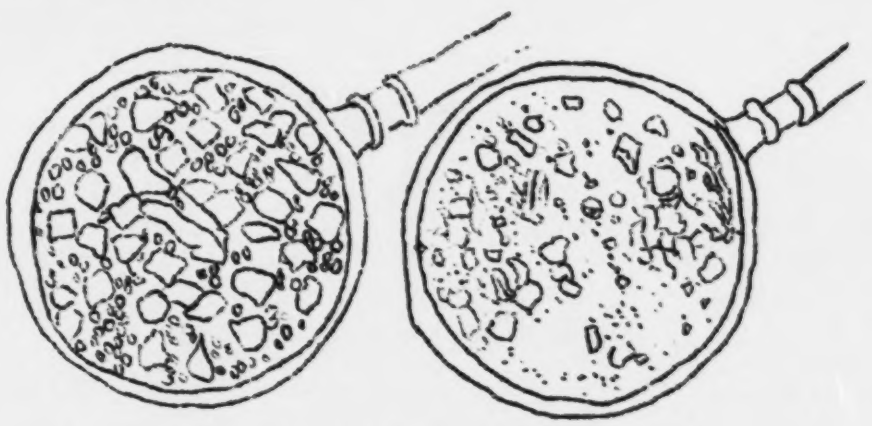
d. Rocks (6)

e. Acorns (6)

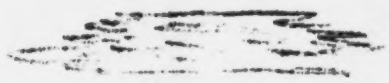
f. Pine cones (6)



g. Soil samples - Try to locate five or six different color soils or different textured soils (sand, black top soil, clay type, yellowish clay, etc.).

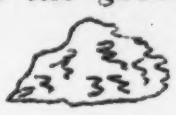


h. Rotting or charred wood samples (6)



i. Leaves (6)

j. Bark samples from the ground only (6)



5. If you want to save items for use next year spray the appropriate items with plastic (1/2-1 hour).

6. Place each item, when dry, into a small plastic sandwich bag.

7. Prepare "feely" cards. Each card should contain one word describing a feel. The children will find one item that feels like the word when on the nature hunt. Words you might use are fuzzy, crispy, prickly, bumpy, rough, smooth, squeezy, fluffy.

8. Label the bags. If you have six groups you will need six sets of materials. Each set will contain one rock, one soil sample, one dead leaf, etc. Every plastic bag for a group will be labeled with the same numeral. Label tags can be purchased or made from light cardboard and string. Remember each photograph must be labeled, too (3 to 4 for each group).

9. Prepare and label containers (1/2-1 hour). Select either three pound coffee cans or shoe boxes. Label the container, the cover and each item in a plastic bag carefully with the same numeral. Include:

   a. Three or four photographs.

      1) Landmark - man-made or natural
      2) Water area - one view
      3) Tree
      4) Special natural feature
      5) Label all photographs with the numeral of the container

   b. One leaf

   c. One dead leaf

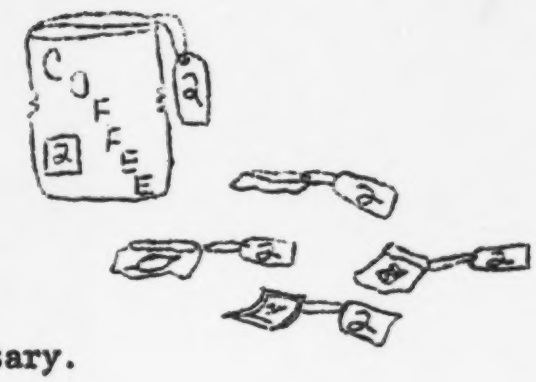
   d. One or more weeds

   e. One rock

   f. One soil sample

   g. One bark sample

   h. Make any substitutions necessary.



B. For Classroom Use

1. Prepare word cards for the items you are actually including in the hunt. They will probably include some of the following.

a. Leaf
b. Leaves
c. Plant
d. Weed
e. Rock
f. Soil
g. Bark
h. Creek
i. River
j. Sand
k. Dead
l. Acorn
m. Pine cone
n. Seed
o. Seed pod
p. Wood
q. Charred wood
r. Fuzzy
s. Crispy
t. Prickly
u. Bumpy
v. Rough
w. Smooth
x. Squeezy
y. Fluffy

2. Prepare any other word cards you feel would be appropriate to the group.

a. Nature Hunt
b. Like
c. Similar
d. Park
e. Walk
f. Bus
g. Trip
h. Plastic bag
i. Container
j. Box
k. Coffee can
l. Numeral
m. Tag
n. Item
o. Picture
p. Photograph
q. Arrange
r. Re-arrange
s. Humans
t. Evidence

C. Pre-trip Arrangements

1. Bus, if needed.

2. Permission slips for trip.

3. A parent to help each group leaving to freely answer questions and observe learning and reactions, take notes.

4. Prepare name tags for each group. A different color for each group, a numeral for each group (a numeral should correspond to the Nature Hunt container they will receive), and the child's name.

5. Label several note cards with the group numeral and parent's name.

6. Label a large brown paper bag for each group. Use the group numeral and the parent's name.

Classroom Activities

A. Introduce the concept of like and similar (2 days). Select man-made items that are exactly alike - blocks, rulers, coffee cans, etc. Point out their exact likenesses. Select two blades of grass, two leaves, two rocks, two pieces of bark and point out their similarities. It is exceedingly difficult to locate two blades of grass, two leaves, two twigs, two rocks, that are exactly alike. We call them "similar", the same kind, from the same plant, of the same color or texture. You can be very exacting in looking for similarities (leaf is from the same kind of tree), or you can be very loose in looking for similarities (any two leaves). On the first day of this study, plant the idea of man-made items and natural items with a view to "alike" and "similar". Have the examples ready or available. On the second day ask the children to bring in items or tell about items they found.

B. Introduce the containers (1 day)

1. Show the class one container.
2. Indicate the labeling by numeral.
3. Show them that all numerals are the same in each container.
4. Examine and display all items.
5. Bring out the other containers and have groups of children examine them and contents.
6. Exchange containers if there is time.
7. Make comparisons between containers.

C. Have the children:

1. Discuss the items, numerals and containers.
2. Arrange the items.
3. Re-arrange the items.
4. Play with the contents (several days).
5. Study the word cards (including matching them with the item).

D. Place all items back into the plastic bags; re-check to be sure there is one rock for each numbered bag; one soil sample, etc.

E. Place all items labeled in the proper container.

F. Place several empty small plastic bags into each container and a few rubber bands.

G. Place the photographs into the container on the day of the trip. Remove them upon returning to the school because the moisture on the natural items may ruin the photographs. If you are using a three pound coffee can, curve the photographs inside; do not fold or bend them sharply.

Field Trip

A. Instruct mothers of the easiest and most convenient plans for discipline, order of group activities, meeting time and places.

1. Keep your group of four or five children in sight.

2. Gather at a certain place for lunch or snacks at ___ o'clock.

3. Keep an open mind to children's opinions and thoughts.

4. Note final meeting time for returning to school.

5. Adjust your activities to any bathroom use and drink time necessary.

B. Suggested order of activities

1. One-half to one hour of free exploration (group of four or five stay within sight of their parent leader).

2. Gather for snack or lunch (20-30 minutes).

3. Pass out a Nature Hunt container to each group (5 minutes).

4. Give each parent a large brown paper bag, several note cards and a pencil.

5. Examine contents of the container (10 minutes).

6. Hunt for similar items in nature (1/2-2 hours - #6, 7 & 8). No contribution is incorrect as any item will have some attribute they share. Do ask the children what similarity they see as this will help them clarify their thinking. Place these items either directly in the container or into a plastic bag and then into the container.

7. When hunting for the location in the photograph, encourage discussion. Have the entire group of four or five determine the location and ask the parent to jot down any interesting conversations or debate that went on and if they could successfully locate the spot.

8. When or if all items are located, return to the teacher for additional mystery items to find. Place both into the container.

9. 10 to 20 minutes before leaving time children use the brown paper bag to collect "evidence" that humans use the area.

Post-Trip Activities

A. Putting things in order

1. Remove the photograph from the containers to avoid ruining them.
2. Collect the note cards for your use in evaluating and stimulating discussions.
3. Label the contents of the brown paper bag. Use the same labeling system as before.
4. Label the collected matching items in each container.
5. Display all items from each group in a separate area.

B. Sharing ideas and reflections

1. Discussion
2. Experience chart
3. Class built story
4. Invite in a person (principal) or group (another class) to tell about the trip.

C. Personal responses

1. Drawing or painting of memories
2. Tape record personal reflection
3. Tape record story or poem

D. Other things to do

1. Class write a simple poem.
2. Develop a simple melody to fit the poem.
3. Draw pictures of each event of the trip and display them in order.
4. Draw pictures of each event of the trip and have children place them in order - use as a game.

E. Ordering the items

1. Encourage all children to spend time arranging and re-arranging the items into "sets" of like or similar items.
2. Have individuals or groups create displays using a word card and all items that can be displayed with it.

3. Encourage free creative thinking in ordering ideas from the children.

F. Discussion suggestions

1. Personal responses to any part of trip

2. Sharing insights

3. Sharing ordering ideas

4. Review "alike" and "similar"

5. Examine evidence of humans

"What is it?"
"What is it used for?"
"Where was it found?"
"What does this tell you about the people who left it?"

6. Uses of the area

How kindergarteners use the park
How parents use the park
How grandparents use the park
How could the park be made more fun for kindergarteners, parents, grandparents, crippled children, etc.

G. Activities for older children

1. Develop a chart of the materials and word cards.

2. Select items that can be displayed in "sets" both vertically and horizontally.

3. Do all the preparation for a kindergarten class.

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ENVIRONMENTAL SCIENCE CENTER

OUTLINE OF ART TECHNIQUES AND ACTIVITIES DEVELOPED FOR THE NATURE'S ART COURSE

FALL QUARTER - 1968

Introduction

Nature's Art has received attention from the Environmental Science Center staff because of its exciting learning potential for a group of children. The child looks, feels, and experiences his environment as he collects natural items for his art projects. We have tried to emphasize the display or reproduction of the item in its natural form and natural setting.

Our main objectives, which lie behind having children do these activities, is to get children into intimate contact with their environment and to have them learn, first hand, of its many components.

Children learn faster, more, and more enthusiastically when they touch the real world rather than experiencing only vicariously as is the case with many classroom activities.

The art activities suggested on the following pages were collected or invented for the Nature's Art course at the Environmental Science Center during the Fall Quarter of 1968.

In every case an effort has been made to present a new or little known technique for display, reproducing, or using natural items as media. We wanted to present art experiences that would also be science experiences. In most cases, these two aims do hold true, in several activities, however, one needs to stretch the imagination considerably to see the science applications (i.e. scrap lumber structures, sand core carving, twig and root monsters).

We have included several techniques for reproducing natural items by printing, casting, or photographing.

Unique displays are suggested for showing plant growth near a pond, arrangements with driftwood, pebbles, and dried weeds, etc.

Using natural items as media is suggested with sand painting, soil painting, cattail rush mats, etc.

The artistically arranged mini-terrarium is a way to bring life to art.

We added a few activities just for fun (i.e. a garbage and imaginative monsters).

At any rate, this is just a beginning. Try these ideas, expand, and enrich them to suit yourself and your class of children. Let us hear where these ideas take you so that we can share your ideas with others.

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ENVIRONMENTAL SCIENCE CENTER

OUTLINE OF ART TECHNIQUES AND ACTIVITIES
DEVELOPED FOR THE NATURE'S ART COURSE

FALL QUARTER - 1968

I. Printing

A. Blueprints

1. Materials

a. Blueprint paper

1. Leaves
2. Weeds
3. Grains
4. Branches

c. Four or five sheets of glass or plexiglass (these can be varied in size to accommodate small or large compositions) (hardware store)

d. Heavy cardboard or wood in various sizes to be used as backing while printing (children bring)

e. Clothespins — clip-on type (hardware)

f. Light source

1. Sun
2. Overhead or other projector (school)

2. Techniques

a. Cut a piece of blueprint paper to accommodate the items you have selected.

b. Place a heavy cardboard under the blueprint paper (on the white side).

c. Arrange your natural items on top of the blueprint paper (blue side).

d. Place a piece of glass on top of the arrangement.

e. Place several clip-on clothespins around the edge of the four layers

f. Expose the top (blue side) to your source of light until the visible paper has lost most of its color.

g. Separate everything and rinse the blueprint paper in water to "fix" your print.

h. Dry flat.

i. Trim before displaying.

B. Tempra or printing ink

1. Materials

   a. Paper 12 x 18, 9 x 12 (school supplies)

      1) White drawing
      2) Manila
      3) Assorted colors

   b. Tempra paints or washable printing inks (school supplies)

   c. Paint rollers (hardware) 3 or 4 inches or larger

   d. Containers to pick up paint with rollers (paper plates, plastic toys, etc.)

2. Preparation

   a. Select a location in the room for each color you are planning to use (color station).

   b. Place one color of paint or ink, a roller, and a container for picking up the paint on the roller at each color station.

3. Techniques for applying paint to the paper

   a. Place the item to be printed on your paper.

   b. Cover a roller well with paint.

   c. Lightly roll over the item to place paint around it on all sides. Continue this until you are satisfied with the depth of color.

   d. Quickly lift the item up.

   e. Your print will be a silhouette.

   f. You may repeat this on the same piece of paper using different colors, different natural items, or different locations on the paper.

4. Technique for applying paint to the natural item

   a. Place paint on the natural item by:

      1) dipping it in paint, or,
      2) rolling paint onto it.

   b. Place this painted item on a piece of art paper and place a second piece of art paper on top.

   c. Press carefully and slowly along all the parts of the item so that the paint will be picked up.

   d. Pick up the top print and the natural item — you have made two prints at once.

   e. You may have it as it is or add variations by using several natural items, different colors and trying different arrangements to create pleasing composition.

C. Copy machine

1. Materials

a. Copy machine (3M) (Thermo-fax)

b. Natural materials gathered by individuals

1. Leaves
2. Weeds (12 inches long or less)
3. Grains
4. Other light weight or lacy items

2. Technique

a. Place a natural item on flat plate for one copy.

b. Set dial to a middle setting.

c. Follow machine directions.

d. Adjust dial for desired darkness.

e. To make a composition of more than one item you must place all the items on the copy together in the arrangement you wish.

D. Pattern printing

1. Materials

a. Paper

b. Ink or paint

c. Brush or roller or pan for dipping into paint

d. Natural item with an interesting rough texture

1) Bark
2) Fish scales
3) Wooden plank

2. Technique

a. Place paint or ink in the natural item by:

1) Dipping in paint.
2) Brushing on.
3) Rolling on.

b. Place item on paper and roll over to print all parts.

c. Repaint and print again if desired.

d. You may want to print an all-over wood grain and then a fish in another color on top.

E. Shadow tracing

1. Materials

a. Paper

1) Large roller paper
2) Smaller paper according to the size of the item you are tracing

b. Leafless twig or small branch

c. Light source — sun

2. Technique

a. Select a sunny, windless day.

b. Anchor your paper down on a smooth surface (sidewalk) with stones, etc.

c. Have a child hold another child's branch in a position that will form a shadow on the paper.

d. Trace the shadow with black crayon or charcoal.

e. Move the branch to form different shadows and trace.

f. Place either one silhouette on a piece of paper or several silhouette of the same branch on one piece to have the children experience the many forms one branch can take.

II. Displaying Natural Materials

A. Collage

1. Materials

a. Fiberboard, 4' x 8' (lumber yard) heavy cardboard 3 x 4 (art supply store)

b. Paste, 1/2 white glue and 1/2 lacquer (hardware store)

c. Applicator

1) Large brush (hardware)
2) Paste spreader (hardware)
3) Piece of wood (home)

d. Natural materials selected for large display

2. Activities

a. Pre-field trip — have participants note the size and dimensions of the area to be covered so that they will bring in large natural samples.

b. Plan who and how many will work on each board.

c. Field trip for collecting.

d. Sort materials.

3. Techniques

a. Place the board or boards on a table or the floor.

b. Each group plan the placement of items on their board.

c. Completely cover the board with the paste (1/2 white glue and 1/2 lacquer) using a brush or paste spreader. This will dry slowly so there is no need to hurry.

d. Arrange materials on the board, push into paste, and hold in place until firm.

e. Continue to dry for 24 hours before hanging.

B. Natural cross-section scene of a pond's edge

1. Materials

a. Fiberboard 4' x 8' (lumber yard)

b. Paste (1/2 white glue, 1/2 lacquer)

c. Applicator

1) Brush
2) Paste spreader
3) Piece of wood

d. Natural materials

2. Activities

a. Take the group to a pond and have them notice the vegetation.

1) In the water
2) At the edge, growing in the water
3) At the edge, growing on land
4) 1/2 foot from water
5) 1 foot from water
6) 2 feet from water
7) 3 feet from water
8) 4 feet from water, etc.

b. Have the group collect vegetation from all eight areas above.

c. Have each collector label his items as to location including distance from water.

d. Be sure to bring back soil, some roots, and duckweed from the water.

3. Techniques

a. Place the board on a table or on the floor.

b. Generally plan where the water area will be, where the water level will be, and where the earth will slope upward and where the land area will be.

c. Completely cover the board with paste (1/2 white glue and 1/2 lacquer) using a large brush or paste spreader. This will dry slowly, there is no need to hurry.

d. Begin with the water area. Place the duckweed and any other water plants there.

e. Spread soil to indicate the upward slope of the pond bottom and share area.

f. Place the plants from each area onto the board in order.

g. Continue working across the board until you have used the space available.

h. Allow to dry 24 hours before hanging.

C. Centerpiece or decorative structures

1. Materials

a. White glue

b. Natural items

1) Twigs
2) Roots
3) Driftwood
4) Rocks
5) Grains and grasses
6) Acorns
7) Pine cone
8) Berries

2. Techniques

a. Collecting will probably have to be done over a period of time and independently to get a variety.

b. Examine all the materials collected.

c. Begin seeing possible combination of driftwood, rock, grain, berry to form one pleasing combination.

d. Glue the items together with white glue, holding them in place until they set.

e. Do not include many natural items, keep the display simple.

D. Imaginative creatures

1. Materials

a. White glue

b. Natural material in weird forms

1) Roots
2) Twigs
3) Driftwood
4) Rocks

2. Technique

a. Collecting will probably have to be done over a period of time and independently to get particularly weird forms.

b. Examine the root and determine how you wish to display it.

c. Place driftwood or rock under it to balance it in the position you want it to take — glue these together.

d. Increase its strangeness by adding an "acorn eye", "berry nose", "mossy hair", etc.

e. Glue it together.

f. Let it dry.

g. Use for creative story or poem writing.

E. Structures

1. Materials

a. Natural material

b. Scrap cardboard or wood

c. Other scraps found around school

d. Glue

e. Pins

f. Plasticene

2. Techniques

a. Gather natural and scrap material.

b. Construct a background for the natural materials from the scrap material.

c. Attach the natural items to this structure.

d. Use as a counter display.

F. Terrariums

1. Materials

a. Containers

1) Plastic

a) Glass
b) Box

2) Glass

a) Jar
b) Drinking glass

b. Plastic material for cover

1) Saran Wrap
2) Baggies

c. Rubber band or string

d. Natural items

1) Soil
2) Living plants
3) Dried plants
4) Rotting bark or wood
5) Acorns, etc.
6) Spiders or other small insects

2. Techniques

a. Carry all materials for holding and covering the terrarium out to the area where you will be collecting.

b. It is preferable to have each individual create his own small terrarium rather than two or three larger ones. One large one along with the small ones would be interesting in a classroom.

c. Be sure every person has their own container.

d. Ask them to put in:

1) Soil
2) A small living plant or two
3) A dried plant
4) A piece of rotting wood or bark
5) An acorn or gall
6) A small spider or other insect

e. Cover all containers with one layer of light weight plastic with one pencil hole for an exchange of air and moisture.

f. On returning to the classroom add a few drops of water.

g. Watch that there is sufficient water inside by noticing the droplets on the inside of the terrarium.

III. Casting

A. Sand

1. Materials

a. Boxes — wooden or cardboard

b. Sand — as fine as is available

c. Plaster of Paris

d. Shellac

e. Liquid soap

f. Item to print

1) Animal foot
2) Animal print in hard soil
3) Large, heavy scaled fish

g. Paper clips for wire loops

2. Techniques

a Paw prints or claw prints

1) Print found outside in hard ground

a) Cut around print.
b) Lift and place in a small box.
c) Coat with shellac.
d) Allow to dry.

e) Fill the rest of the box with sand up to the print level.
f) Coat with liquid soap.
g) Mix Plaster of Paris (add salt for quick drying).
h) Pour the Plaster of Paris about one inch thick over the print.
i) Attach a small loop of wire for easy removal.
j) Allow to dry.
k) Remove and clean.
l) You have a positive print — you can coat this cast with liquid soap and use it to create other negative or indented casts.
m) May be done on the spot where the print is found, also.

2) Paw or claw brought into classroom

a) Clean and dry paw.
b) Pour sand into a small box.
c) Smooth sand out.
d) Press the claw or paw into the sand to make a normal looking print.
e) Mix the Plaster of Paris (add salt for quick drying).
f) Pour it over the print about one inch thick.
g) Attach a small loop of wire for easy removal.
h) Allow to dry.
i) Remove and clean.
j) You have a positive print — you can coat this cast with liquid soap and use it to create other negative or indented casts.

B. Museum of natural history demonstrations

1. Wax casting

2. Rubber casting

IV. Structures

A. Straws

1. Materials

a. Straws, 2 or 3 large

b. Pins

c. Glue

d. Base materials

1) Wood
2) Paper
3) Tray

2. Technique

a. Using all materials listed above, create an interesting structure.

b. This may be done individually or in groups.

c. After the structure is complete you may wish to have them test the strength of their structure by cutting straws here and there to see how many cuts it can withstand (see E.S.S. unit — Structures).

B. Anomaly (see II. E. Structures)

C. Mobiles

1. Materials

a. Wire

b. String

c. Thread

d. Natural materials

1) Branches
2) Twigs
3) Driftwood
4) Leaves
5) Grains
6) Weeds
7) Acorns
8) Pine Cones
9) Bark

2. Technique

a. Lay out the mobile on a table or the floor.

b. Begin at the bottom attaching the smallest or bottom items to the next one up checking on balance as you go.

c. Continue from bottom to top.

d. When the mobile is complete the balance will be built in.

D. Scrap lumber

1. Materials

a. Scrap pieces from a local foundry

b. Glue

c. Nails

2. Technique

a. Contact a local foundry for scrap materials (small cut pieces of hardwood will probably be among their scrap items).

b. Examine the pieces and the various shapes.

c. Select pieces that will compliment or fit with each other when creating a representational structure.

d. Clean the wood.

e. Glue or nail together.

f. Add shellac or paint.

E. Centerpieces (see II. C.)

V. Photography — Object: Use of photography by students for graphic recording and display (technique of developing films and prints in the classroom)

A. Introduction to materials

1. Film developing tank
2. Roll film
3. Developing procedure
4. Print making procedure

B. Technique

1. Film developing

a. Loading Ansco film developing tanks in the dark after practice in the light.

b. Solutions poured into tanks from bottles (Microdal, 10 min.; stop, 1 min.; acid fixer, 2 to 5 min.) — pouring done over tank.

c. Wash — then dry film in front of fan.

2. Printing

a. On blueprint paper wi th the light of an over-head projector

b. On contact paper in dimmed classroom lighting

1) Quickly draw print paper from light tight box.
2) Place paper under negative holding the two firmly together.
3) Expose to single incandescent light source (100 watt bulb at 10 feet for count of 10 to 15).
4) Quickly transfer to Dektol developer (keep face down in black tray for one minute).
5) Quickly transfer (face down) to tray of acid fixer one to five minutes).
6) Prints are slightly fogged by illumination in room, but otherwise prints should be sharp and acceptable.

VI. Sand

A. Sand painting

1. Materials

a. Find sand

b. Babyfood jars

c. Spoons

d. Food coloring

e. White glue

f. Container for glue mixture

g. Paper plates

h. Brushes

i. Paper

1) Soft colors and white
2) Any size

2. Technique

a. Coloring the sand

1) Fill babyfood jars about half full of sand.
2) Put in several drops of food coloring.
3) Stir.
4) Check if the color is the shade you want — add more color if desired.
5) Shake the colored sand out on a tray or piece of paper.
6) Allow to dry overnight.

b. Preparing the glue

1) Fill a jar or glass half full of white glue.
2) Add enough water to fill the jar.
3) Keep some glue in the original container at original strength.

C. Painting

1. Simple design

a. Plan your design and colors you will use.

b. Using a paint brush, stroke on the glue solution where you want one color.

c. Sprinkle on sand.

d. Shake off excess sand into a tray or paper plate.

e. Brush on shape for another color.

f. Sprinkle sand on.

g. Shake off excess.
h. Continue until design is finished in all colors.

2. Raised design

a. Plan your design and the colors you will use.

b. Using the glue bottle, squeeze a thick line of glue onto your paper where you wish to have one color.

c. Sprinkle sand on.

d. Shake off excess.

e. Squeeze another line where you want another color.

f. Sprinkle sand.

g. Shake off.

h. Continue until your design is complete in all colors.

3. Scene painting

a. Paint glue solution over entire picture.

b. Carefully sprinkle colored sand in the areas desired for background — cover the entire surface.

c. Add on as many layers of color as desired.

d. Allow to dry.

e. Squeeze glue from the tube for the foreground items.

f. Sprinkle on sand in several layers.

g. Gently shake off excess.

VII. Soil Painting

A. Materials

1. Main soils and sands of as many colors as possible

2. Baggies to hold the soil

3. White glue

4. Container for glue mixture

5. Brushes - two sizes, both small — 1/2 inch and 1 inch

6. Wood or cardboard (consider the weight of the piece of wood since you may wish to frame and hang your final results)
(If you used a piece of wood with an interesting wood grain, you can incorporate the wood grain into the scene)

B. Preparation

1. Gathering soils

a. Where

1) Yard
2) Beach
3) River and creek banks
4) Road cuts, etc.

b. What

1) Sands
2) Garden soil
3) Peat
4) Clay
5) Crumbled rock

2. Preparing the glue

a. Fill a jar or glass half full of white glue.

b. Add enough water to fill the container.

c. Keep some glue in the original container at full strength.

3. Planning

a. Plan scene, design, or picture.

b. Sketch plan on cardboard or wood.

C. Soil Painting

1. Using a paint brush, stroke on the glue solution where you want one type of soil.

2. Sprinkle on soil.

3. Leave the soil in container with the glue until it is dry.

4. Brush glue on another area of your picture, not adjacent to the drying area.

5. Continue until scene is complete.

6. Suggestions:

a. For blending colors, work beside each other when glue is wet.

b. For sharp color distinctions, wait for drying.

c. For sharp and narrow lines, apply glue in full strength directly from the bottle, sprinkle soil, and shake off excess immediately.

d. For any raised line, apply glue in full strength directly, also.

e. For a heavy raised object, mix your soil with plaster of Paris and apply immediately. Mix a small amount with a great deal of soil in it because it dries lighter than it goes on.

D. Preserving

1. When the soil is completely dried, stand the picture on a side and the loose particles will fall off.

2. Repair any areas that need it.

3. Spray with plastic.

4. Frame if you wish.

VIII. Cattail Rush Mat

A. Cut cattail rushes in late summer or early fall when they are full grown and before frost.

B. Prepare in one of two different ways.

1. Separate leaves from each other, wash off lower ends, and hang up loose bundles to dry quickly. This retains the green color of the rushes.

2. Separate leaves from each other — bind the leaves in small bundles and immerse in a large container of water. The leaves get limp as they are immersed so can be forced to bend around in a pail or kettle much like spaghetti — the boiling removes the color and the leaves become a light tan or cream color.

C. Hang rushes up to dry if they are to be saved for a later time.

D. Moisten or immerse in hot water before starting mat.

1. If rushes are to be dyed, they can be boiled with various leaves or barks or with fabric dyes at this time.

2. Keep the rushes moist and limp while constructing the mat.

E. Mat making

1. Materials

a. Rushes

b. Thick cord or clothesline for edge

c. Grocery string or twine for thonging

d. Heavy strong thread and a long needle for sewing rushes together

2. Tie or stake down a length of cord.

3. Lay pairs of rush leaves over each other base end of one upon terminal end of the other.

4. Wrap one end of the pair around cord and thong with string (see illustration).

5. Wrap second pair in reverse direction, third like first, etc. Pull rushes tightly against each other along the cord.

6. When sufficient leaves have been thonged for the size of mat wanted:

a. Tie off the thonging string to the rope.

b. Cut off tab ends of thonged rushes with a scissors to leave a neat edge on both sides of the mat.

7. The started mat will now consist of alternated pairs of leaves both front to back and side by side.

8. Sew front layer of side by side alternating leaves together.

a. Use doubled thread in a long needle, knot at end.

b. Insert needle from back of first leaf near the edge and run it diagonally forward to the front of leaf near the edge that is in contact with the next leaf.

c. Do the same for each leaf in turn effecting an overlapping, venetian blind effect.

d. Do not pull thread too tightly — maintain the same width as the edge along the cord.

e. Tie off thread at opposite side of mat.

f. Sew at intervals of six to twelve inches down the length of the leaves.

g. Leave enough at end of leaves to thong this edge in same fashion as original edge.

9. Reverse mat and sew layer of leaves on other side.

10. Stake or tie down a cord for thonging trailing ends of leaves in the same manner as described.

11. Cut cords and knot to keep thonged rushes from slipping off.

12. Lay mat out to dry.

F. Mat may be rolled in the direction of the thonged edge for storage – rolling it the direction of the leaves will crack it.

IX. Garbage (for fun and clean up)

A. Materials

1. Items picked up around the school ground that don't belong there

a. Papers

b. Wood

c. Metal

2. Large paper bags

3. Glue

4. Tacks

5. Nails

6. Plasticene

7. A base for the structure

a. Pail of sand

b. Heavy board

B. Technique

1. Plan to create a funny structure from the items found on the school ground

2. Take a trip around the school ground cleaning up all such items.

3. Sort the items.

4. Throw away items that cannot be used on structure.

5. Plan structure.

6. Build structure.

a. Base upward

1) Heavy to light items

X. Man's Use of Natural Themes in Design

A. Materials

1. Print fabric samples

2. Wallpaper book

3. Pictures of design on any man-made item

4. Books

    1) Furniture decoration
    2) Rug design
    3) Quilt design
    4) Embroidery design
    5) Silver dish and glassware design and decoration
    6) Or the real items listed 4, 1-5

B. Activities

1. Initiate the activities by bringing in a wallpaper design book.

2. Examine with the class.

3. Note the many ways the designer has used familiar natural items in his design.

4. Design wallpaper using natural items.

5. Ask all participants to bring in a piece of fabric or clothing where items of nature show up in the print.

6. Design fabric print.

7. Design silver pattern, plate decorative pattern, or glassware pattern.

8. You may want to collect samples of nature in design and original designs in folio or notebook form.

9. Other design types will be noticed — geometric or line form design — if there is interest, you can continue creating design along varied themes.

TRASH IS TAKING OVER

"Let's go on a picnic!"

"Okay. I'll bring the hot dogs, you get the pop."

You're in the grocery store. What kind of pop will you buy? What kind of containers will you choose? The handiest, of course!

Why not make a survey before you decide? Find out how much trash your classmates and their families produce in a week that cannot be re-used or will not decompose naturally. Your mother may help you in keeping a record at home. You can estimate the amount that accumulates in a year by multiplying by 52, and then the amount accumulated by all the families from your school by multiplying by the number of classes.

KEEP A RECORD

Make a class chart to record the number of cans and bottles each family throws away each day. It could look like the one below:

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Total
John	5	4	8	3	2	10	15	
Earl	3	2	12	4	1	8	6	
Jackie	2	4	5	4	7	6	8	
Debbie	6	8	9	4	7	9	10	
All other class-mates								
Total								

Then multiply to estimate the number thrown away in a year by your class and by the whole school.

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_____	X	52	=	_____
Total number of cans thrown away by your class in a week.		Number of weeks in a year.		Number of cans and bottles thrown away by your class in a year.

_____	X	_____	=	_____
Number of cans and bottles thrown away by your class in a year		Number of classes in your school		Number of cans and bottles thrown away by the children in your school in a year.

Just How Much Is That?

If you were to set the cans and bottles in a long line, how long would it be? Follow this method and find out.

1. Mark off a distance of 10 feet on the floor in your classroom. Masking tape could be used for the line.

2. Bring cans and bottles from home and set them along the line. Try to get a good assortment of sizes and be sure the bottles and cans are clean before you bring them to school.

3. How many cans and bottles fit side by side along the 10 foot line?

   _____ = 10 feet
   Number of bottles and cans

4. Now divide the number of bottles and cans in 10 feet into the total number of bottles and cans thrown away by the children in your school in a year.

No. of bottles and cans thrown away in a year	÷	No. of bottles and cans in 10 feet	=	Number of 10 feet sections

5. To find the length of the line if all the cans were set end to end, multiply 10 times the number of 10 foot sections.

10 x _____ = _____ feet
number of 10 feet sections — length of the line of cans

6. To find the length of the line in miles divide 5,280 (the number of feet in a mile) into the length of the line of cans in feet.

Length of the line of cans in feet ÷ 5,286 feet in a mile = _____ length of the line in miles.

What Do Your Results Indicate?

Discuss the following questions with your classmates:

Do you think the disposal of all of this trash may become a problem?

Where does it go?
(You may need to call the City Hall to answer this question).

Could re-usable containers help to solve this problem?

How about pop? Would it help to buy only returnable bottles rather than disposable cans and bottles?

Is it worth it to buy only returnable bottles rather than the handier disposable ones?

You and your classmates may disagree on this. Also ask your parents for their opinion.

WHAT CAN YOU DO?

If you feel convinced that something must be done about the large amounts of trash you could:

Ask your parents to buy only returnable pop bottles.

Report the results of your survey to the other classes in your school and ask them to talk to their parents.

Write letters to the editor of newspapers encouraging people to buy only returnable pop bottles.

Report your results to classes in other schools in your town. Ask them to talk to their parents.

What would happen if everyone in your community would only buy returnable pop bottles?